

IN connection with the University of London, we notice that Mr. A. G. Tansley, assistant professor of botany and lecturer on plant anatomy at University college, will deliver a course of eight lectures on "The Evolution of the Vascular System in the Fern-phyllum," beginning on January 26, at University College. At the physiological laboratory of the University, a course of eight lectures on "The Physiological Effect of Compressed Air" will be given by Mr. Leonard Hill, F.R.S., beginning on January 15. A course of five lectures on the "Structure and Classification of the Myriapoda and Arachnida" will be given at University College by Mr. R. I. Pocock, beginning on January 14.

THE Paris correspondent of the *Times* reports that M. Briand, the French Minister of Education, proposes to suppress the baccalauréat, the degree conferred on a boy on his admission to a French university. Such admission is of necessity preceded by several years' school training, during which the boy is prepared in a somewhat mechanical manner for the examinations on which his admission to the university depends. The system, according to the *Times* correspondent, "is the nearest approach known in Europe to the mandarin method of China." It is very widely felt that at the end of their school careers the boys lack initiative and originality as the result of the undue appeal to their verbal memories, and it is hoped that the abolition of the baccalauréat will discourage the rigid uniformity which characterises French secondary schools, and lead to an endeavour to adapt the curriculum of a school to the particular needs of the pupils attending it.

SEVERAL substantial gifts for the advancement of higher education are recorded in recent issues of *Science*. Among these may be mentioned donations of 20,000*l.* each to Western Reserve University, Cleveland, O., by Mr. H. M. Hanna and Colonel Oliver H. Payne. The 40,000*l.* thus subscribed is to be used in establishing and endowing a laboratory of experimental medicine in the medical school. Mr. William Smith, of Geneva, N.Y., is to found a woman's college. The name of the new college will be the William Smith College for Women, and it will have an endowment of about 70,000*l.* A "Carl Schurz memorial professorship" is to be established at the University of Wisconsin as a result of the movement recently started in Milwaukee by a number of prominent German-Americans. The plan is to raise an endowment of 10,000*l.*, the income of which will be used for the establishment of an annual course of lectures at the State university, to be given by prominent professors of German universities. Mr. Andrew Carnegie has offered to give Washburn College, Topeka, Kans., a second 10,000*l.* for its endowment fund, provided the total endowment reaches 40,000*l.* by January 1, 1908.

THE tenth of the series of articles on "Public School Education" which is being published in the *Times* appeared on December 28, 1906. This contribution deals with laboratories and practical work in the teaching of science, and is by the Rev. T. Nicklin, of Rossall School. Mr. Nicklin says, "it would be hard to find a single public school of recognised position that has not a laboratory which, if not palatial, is yet adequately equipped for that end of science teaching that is regarded in England as educationally best." A little later the article asserts that while the masters in the public schools adhere to the theory that lectures and intellectual teaching must be the staple of the work, the English public schools have from the first made considerable use of the laboratory, and to-day that use is on a larger scale and more thorough in character than ever before. Mr. Nicklin describes the laboratories of an average public school, and indicates briefly the course of study followed. Though it would have been more satisfactory if, in addition to his generous estimate of Prof. Armstrong's work in improving English science teaching, Mr. Nicklin had insisted more upon the paramount importance of laboratory practice in the teaching of science, his article is valuable in showing the very substantial improvement made during recent years in the way in which science is regarded by public-school authorities. Many readers of *NATURE* will remember the days when any sort of practical lesson was unknown in public

schools, and to hear that every such school now has well-equipped laboratories—even if in some cases they are not used enough—is convincing proof that the labours of men of science in the direction of rationalising English public-school education have not been in vain.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Zoological Society**, December 11, 1906.—Dr. H. Woodward, F.R.S., vice-president, in the chair.—An account of the ascidians of the Cape Verde marine fauna collected by Mr. Cyril Crossland: Dr. J. Rennie and H. Wiseman. The occurrence of ten species of Ascidiae Simplicies was recorded, of which three were described as new.—Variations in the arterial system of certain species of Anura: L. K. Crawshaw.—Descriptions of fifty-three new species of African Coleoptera of the family Curculionidae: Guy A. K. Marshall.—The cranial and spinal nerves of *Chlamydoselachus anguineus*: Mrs. O. A. Merritt Hawkes. The paper contained a description of these nerves and discussions of them from the point of view of the nerve-component theory, and showed that the nervous as well as the other systems of *Chlamydoselachus* combined specialised and primitive features.—Two mammals obtained by Major Powell-Cotton in the Ituri Forest: R. Lydekker. The author referred a dark-coloured cat's skin to a race of *Felis chrysotrrix*, and also described a giant elephant-shrew as new.—The skull of a bruang, or Malay bear, from Tibet, representing a distinct race: R. Lydekker.—South Indian nudibranchs: Sir Charles Elliot. A supplementary account of the radulae of various species based on microscopic slides prepared by Alder and Hancock, discovered in the Hancock Museum at Newcastle-on-Tyne. These slides confirmed many of the identifications suggested in the first paper, and in particular showed that *Doris glenei* was a *Chromodoris*, and that *Doris villosa* was *Thordisa maculigera*, Bgh.

**Faraday Society**, December 11, 1906 —Dr. T. M. Lowry in the chair.—Contributions to the study of strong electrolytes: Dr. A. C. C. Cumming. (1) *The Elimination of Potential due to Liquid Contact*.—Certain solutions have the property of reducing the potential due to the contact of two solutions, and potassium chloride has been used for this purpose. In most cases a saturated solution of potassium chloride does not remove all the diffusion potential; indeed, if the solutions in the cells be strong, it only removes a small part. This property of removing more or less of the diffusion potential depends on two factors in the connecting solution, first, the positive and negative ions must be of equal velocity, and, secondly, the concentration of the connecting solution must be high compared with the solutions in the cells. The author suggests a saturated ammonium nitrate solution as that which fulfils these two conditions better than anything else at present known, and shows by experiments with different cells that this is the case. (2) *The Potentials of Silver Nitrate Solutions*.—For silver nitrate the electromotive force gives the same measure of the ionic concentrations as is obtained from the conductivities, and therefore supports the view that the conductivity gives a true measure of the ionic concentration.—The electrochemistry of lead: Dr. A. C. C. Cumming. The results in general prove that lead in the tetrad form is a highly electropositive element, and also direct attention to a curious difference in the behaviour of sodium and potassium nitrates towards lead nitrate.—Storage batteries and their electrolytes: R. W. Vicarey. The paper deals chiefly with some of the problems involved in the manufacture of accumulators, particularly as regards the effect of nitrogen and other impurities introduced consciously or by accident in the process of manufacture.

### PARIS.

**Academy of Sciences**, December 24, 1906 —M. H. Poincaré in the chair.—The determination of integrals of equations of the elliptic type by certain conditions at the limits: Émile Picard.—Differential equations of the second order at fixed critical points: Paul Painlevé.—Magnetic work at the town of Tananarivo and district: Ed. El

**Colin.** A table is given showing the results of the magnetic observations at twenty stations, to which is appended a discussion of the perturbations.—The evolution of the Tertiary mammals: the importance of migrations. The Miocene epoch: Charles **Depéret**.—The perpetual secretary announced the death of Jean Abraham Chrétien Oudemans, correspondant of the academy for the section of geography and navigation, and of Jacques Augustin Normand, correspondant for the same section.—The nature of the atmospheres of Mercury and Venus: P. **Salet**. Details are given of the method of observation by which it has been found that the light from Mercury is not sensibly polarised. It was shown by Landerer in 1892 that the light from Venus is similarly not polarised. The author concludes that it would be premature to draw conclusions as to the nature of the atmosphere of Mercury from this result.—A formula applicable to the times of direct rotation of the planets and the sun: Émile **Belot**. The formula proposed is

$$T = \frac{23.75}{\sqrt{a \cdot D^{2.7}}} + \frac{0.61D}{\sqrt{d}},$$

where T is expressed in hours,  $a$  is the distance from the centre of the system,  $D$  the diameter of the planet in diameters of the earth, and  $d$  the density with respect to water. The times are calculated from this formula in ten cases, and the causes of the two large deviations observed, the sun and moon, discussed.—A method in the calculus of variations: M. **Hadamard**.—Partial differential equations of the second order with two independent variables admitting a group of odd order of transformations of contact: J. **Clairin**.—The extinction of friction: L. **Lecornu**. The motion is considered of a system of homogeneous spheres having their centres fixed, and which exercise given mutual pressures at their points of contact. It is shown that this system, once set in motion and left to itself, has the peculiar property that the work of friction, with respect to the unit of time, tends constantly to diminish. This theorem still holds when, for one or more of the points of contact, the sliding is replaced by a rolling.—The unsymmetrical modification of some absorption bands of a crystal under the action of a magnetic field: Jean **Becquerel**.—The variation of ferromagnetism with temperature: Pierre **Weiss**. A theory of ferromagnetism is given based on a simple hypothesis concerning the mutual actions of the molecules. Experiments have been carried out on magnetite, which previous experiments had shown to be sensibly saturated in a field of 500 Gauss, and of which the temperature corresponding to the disappearance of magnetism,  $587^{\circ}$  C., is easily accessible. The curve drawn from the theory is given, and on the same diagram ten experimental points are shown. The correspondence is very close at one temperature only, that of solid carbonic acid, there being a sensible deviation from the curve.—The negative charge at a distance of a metallic plate illuminated in an electric field: Mme. **Baudeuf**.—The cryoscopic of colloidal solutions of ferric chloride: G. **Malfitano** and L. **Michel**. The authors have shown the possibility in previous papers of using a collodion filter to separate the fine particles from the liquid in which they are suspended, and in the present paper apply this method to determine the lowering of the freezing point of the latter, considered apart from the small particles. In this way they find that the cryoscopic effect of the suspended particles is so small as to be beyond experimental measurement. In this case, at any rate, the magnitude of the suspended particles cannot be determined by cryoscopic methods.—The absolute atomic weight of dysprosium: Gustave D. **Hinrichs**. A discussion of the experimental results of G. Urbain. The atomic weight of dysprosium is assumed to be 162.5 exactly; the experimental figures and those based on this assumption are compared, and the deviations noted.—A colloidal compound of thorium with uranium: Béla **Szilard**. The compound described is obtained by heating precipitated thorium hydrate with solutions of uranium salts.—The action of alkaline silicates on soluble metallic salts: Robert **Dollfus**. A description of the phenomena observed when a crystal of ferrous sulphate is thrown into a solution of sodium or potassium silicate. The experiment has some

analogies with the culture of the artificial cell described by Traube and by Stéphane Leduc.—The definite compounds formed by chromium and boron: Binet **du Jassonneix**. The ingots obtained by reducing chromium oxide by boron in the electric furnace contain two compounds,  $\text{Cr}_3\text{B}_2$  and  $\text{CrB}$ , both of which dissolve in a medium containing less boron, and which can only be isolated in a state of purity from nearly homogeneous ingots, the composition of which nearly corresponds to the substance required.—The anhydrous protoxides of the alkaline metals: E. **Rengade**. By applying to rubidium, potassium, and sodium the method previously used to obtain the oxide of caesium,  $\text{Cs}_2\text{O}$ , the lower oxides of these metals, possessing the general formula  $\text{R}_2\text{O}$ , have been obtained in a pure state.—Some sulphates of tetravalent vanadium: Gustave **Gain**.—The use of special steels for rivets: G. **Charpy**. A systematic study of the thermal and mechanical properties of various alloys of steel has led to the use of a chrome nickel steel for rivets, the strength of which is 2.5 times that of the metal usually employed for this purpose, and this without the need of any special precautions in practical use.—Some methods of estimating nitriles and carbamides; H. **Guillemand**.—A new method for estimating free sulphur: E. **Berger**. The sulphur is dissolved by fuming nitric acid to which a little potassium bromide has been added. This reagent acts in the cold, and in a few minutes.—The molecular weight of elaterine: A. **Berg**. The author has repeated his determinations of the molecular weight of elaterine, with the result of confirming his earlier views. The formula would appear to be  $\text{C}_{28}\text{H}_{38}\text{O}_7$ .—Contribution to the study of the hydroxamic acids: R. **Marquis**. Benzhydroxamic acid, treated with thionyl chloride, gives phenyl isocyanate by a kind of Beckmann transformation. Salicylhydroxamic acid behaves differently, oxycarbanil being quantitatively formed.—A new method of formation of organic compounds of phosphorus: J. **Berthaud**. White phosphorus, heated with an alcohol in a sealed tube at  $250^{\circ}$  C., after some hours completely disappears. Among the products of the reaction are phosphines, hydrogen phosphide, some phosphinic acids, and tetralkylphosphonium hydrate, the latter being the chief product.—The experimental reproduction of lithospherical folding: M. **Hirtz**. The effects of the gradual contraction of a planet are imitated by a layer of paraffin enclosed between two distended rubber spheres, the internal one being slowly deflated, and the contact of the external sphere with the paraffin being maintained by external pressure. The surfaces thus produced are compared with the surface of the moon.—The origin of helicoidal windings in crystallised bodies: Fred. **Wallerant**.—Corrosion figures: P. **Gaubert**. A study of the corrosion figures produced on phthalic acid crystals by mixtures of alcohol and water.—A new mineral species, nepouite, a hydrated silicate of nickel and manganese: E. **Glasser**. The mineral was found in New Caledonia. The analyses lead to the composition  $2\text{SiO}_2 \cdot 3(\text{Ni}, \text{Mg})\text{O} \cdot 2\text{H}_2\text{O}$ . The name of nepouite is proposed from the place Nepoui, the locality where it was first observed.—The experimental reproduction of the mycetoma with black seeds: E. **Pinot**.—The nature of the latent life in seeds and on the true characters of life: Paul **Becquerel**.—Luminous radiations and the richness of wheat in nitrogen: J. **Dumont**. The radiations at the blue end of the spectrum are those possessing the greatest effect in causing the migration of nitrogenous materials, especially gluten, in seeds.—The influence of the valency of metals on the toxic power of their salts: Henri **Micheels**.—The genesis of proteid materials by a pathogenic microorganism at the expense of definite chemical substances: J. **Galimard** and L. **Lacomme**.—A new species of the genus *Iticyon* (*Speothos*) coming from the equator: E. L. **Trouessart**.—The influence of the geographical situation on the development of height in man: Eugene **Pittard**. A study in the Canton Valais, Switzerland, of the effects of soil, altitude, and aspect upon the human height.—Researches on nutrition balance of nitrogen and common salt: M. **Letulle** and Mlle. M. **Pompiilian**.—An apparatus for administering chloroform. The Roth-Droeger apparatus: M. **Guglielminetti**. The regular distribution of chloroform in the tissues when using an air-chloroform mixture of known proportions is based on the assumption that the breathing is regular. The apparatus



described permits of the administration of a given quantity of chloroform in a given time, whatever may be the respiratory activity.—The preservation of chloroform, and an arrangement indicating its accidental alteration: Pierre Breteau and Paul Woog. Pith tinted with Congo red is recommended as the most practical means of detecting acid alteration products in chloroform.—The physiological action of Euphorbium resin: L. Pénierres.—The nature of vaccine virus: H. Nicolle and M. Adil-Bey.—The causes of alteration of butter. The bacteriological control of butter manufacture: M. Mazé.—The geological constitution of the Chézery region: Attale Riche.

## CALCUTTA.

**Asiatic Society of Bengal**, December 5, 1906.—The common kestrel (*Tinnunculus alaudarius*): Lieut.-Colonel D. C. Phillott. Note on the breeding and distribution of this bird in India; its use in Persia as a decoy for hawks; its employment by the Arabs for training greyhound puppies destined for the sport of gazelle-hawking.—Note on the falcon (*Falco jugger*): Lieut.-Colonel D. C. Phillott. Note on habits, breeding, prey, and use in falconry, with a detailed description of and a figure illustrating its use as a *barak*, or decoy with nooses, by Indian hawk-catchers.—*Swertia tongluensis*, and a new variety of *Swertia purpurascens*: I. H. Burkill. Records the result of observations in the field upon the difference between *Swertia tongluensis* and *Swertia Chirata*. Both plants are equally bitter. The new variety of *Swertia purpurascens* was collected in the Sikkim Himalaya. It differs from the type in several features, and the finding of it extends the range of the species to the east of Nepal.—Hunting-dogs from an Arabic manuscript of the fourth century: Lieut.-Colonel D. C. Phillott and R. F. Azoo.—A specimen of *Felis tristis*, Milne-Edwards, in the Indian Museum: N. Annandale. The skull of this rare cat is figured and described from a specimen of unknown *provenance*. The most characteristic feature of the dentition is the high development of the anterior *præmolar*.—Miniature tank worship in Bengal: A. N. Moberly.—The Rajmahal hill folk. The Saorias of the Rajmahal Hills: R. Bainbridge.—Fresh-water fauna of India, No. 11. The occurrence of the medusa, *Irene ceylonensis*, in brackish pools, together with its hydroid stage: N. Annandale. This medusa has been found, with its hydroid stage, in pools in the Ganges delta which probably contain about one-third of the proportion of mineral salts commonly present in sea-water.—Fresh-water fauna of India, No. 12. A preliminary note on the Polyzoa occurring in Indian fresh water and brackish pools, with the description of a new *Lophopus*: N. Annandale. *Victorella pavidus* is recorded from near Calcutta, the "species" of *Plumatella* (*P. repens*, *P. emarginata*, and *P. allmani*) occurring in India are discussed, and a *Lophopus* distinguished from *L. crystallinus* by the shape of its statoblasts is described from a lake in the outer Himalayas.

## DIARY OF SOCIETIES.

## THURSDAY, JANUARY 3.

ROYAL INSTITUTION, at 3.—Signalling to a Distance: the Telephone and its Working: W. Duddell.

## FRIDAY, JANUARY 4.

LONDON INSTITUTION, at 4.—Earthquakes and Geysers: W. Herbert Garrison.

ROYAL GEOGRAPHICAL SOCIETY, at 3.30.—Japan and the Japanese as I saw them: Miss A. L. Murcutt.

## SATURDAY, JANUARY 5.

ROYAL INSTITUTION, at 3.—Signalling to a Distance: Early Wireless Telegraphs: W. Duddell.

GEOLOGISTS' ASSOCIATION, at 8.—On a Norwegian Snowfield and its Glaciers: Horace W. Monckton.

## MONDAY, JANUARY 7.

ROYAL GEOGRAPHICAL SOCIETY, at 3.30.—A Lady's Journey from the Cape to Cairo: Miss Mary Hall.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—The Sixth International Congress of Applied Chemistry at Rome: Walter F. Reid.

VICTORIA INSTITUTE, at 4.30.—The San Francisco and Valparaíso Earthquakes and their Causes: Dr. Warren Upham.

## TUESDAY, JANUARY 8.

ROYAL INSTITUTION, at 3.—Signalling to a Distance: The Radio Telegraph: W. Duddell.

INSTITUTION OF CIVIL ENGINEERS, at 3.—The Simplon Tunnel: Francis Fox.

## WEDNESDAY, JANUARY 9.

SOCIETY OF ARTS, at 5.—Perils and Adventures Underground: Bennett H. Brough.

GEOLOGICAL SOCIETY, at 8.—On the Cretaceous Formations of Bahia (Brazil), and on Vertebrate Fossils collected therein: J. Mawson and Dr. A. S. Woodward, F.R.S.—On a new Dinosaurian Reptile from the Trias of Elgin: Dr. A. S. Woodward, F.R.S.

## THURSDAY, JANUARY 10.

MATHEMATICAL SOCIETY, at 5.30.—Exhibition of Four-dimensional Models: Mrs. A. Stott.—On the Uniform Convergence of Fourier's Series: Dr. E. W. Hobson.—Asymptotic Approximation to Integral Functions of Zero Order: J. E. Littlewood.—Partial Differential Equations of the Second Order having Integral Systems free from Partial Quadratures: Prof. A. R. Forsyth.—On the Singular Points of Some Classes of Power Series in Several Variables: G. H. Hardy.—The Construction of the Line drawn through a Given Point to meet Two Given Lines: Prof. W. Burnside.

INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—New Incandescent Lamps: J. Swinburne.

## FRIDAY, JANUARY 11.

INSTITUTION OF CIVIL ENGINEERS, at 8.—The Balancing of Internal-combustion Motors applied to Marine Propulsion: A. T. Weston.

ROYAL ASTRONOMICAL SOCIETY, at 5.

MALACOLOGICAL SOCIETY, at 8.—Descriptions of New Species of Achatina from the Congo Free State: S. I. Da Costa.—Further Contributions to the Genus *Chloritis*, with Descriptions of Eleven New Species: G. K. Gude.—Description of a New Species of *Papuina*, and Illustrations of some hitherto unfigured *Helicoid* Land-shells: G. K. Gude.—Descriptions of new Non-marine Shells from New Zealand: Henry Suter.

## SATURDAY, JANUARY 12.

ROYAL GEOGRAPHICAL SOCIETY (at The Queen's Hall, Langham Place), at 8.45.—The Duke of the Abruzzi's Expedition to Mount Ruwenzori.

PUBLIC SCHOOL SCIENCE MASTERS' ASSOCIATION (University of London), at 2.30.—The Place of Science and of Literature in a General Education: Rev. and Hon. E. Lyttelton.—The Internal Economy of School Science: Mr. Thwaites.—The best Method of Introducing the Atomic Theory in Science: F. R. L. Wilson.

## CONTENTS.

## PAGE

Plant Dispersal and Kindred Problems. By J. B. F.	217
Petroleum and its Products	218
Recent Advances in Physiology. By Prof. Benjamin Moore	219
Science and Road-Metal. By G. A. J. C.	220
Dynamo Design	221
Our Book Shelf:—	
Cox: "Irrigation with Surface and Subterranean Water; and Land Drainage"	221
Baikie: "Through the Telescope."—W. E. R.	222
"The British Journal Photographic Almanac and Photographer's Daily Companion, 1907"	222
Kirby: "British Flowering Plants"	222
Gahan: "The Fauna of British India, including Ceylon and Burma, Coleoptera, vol. i."	222
Letters to the Editor:—	
Radium and its Disintegration Products.—Dr. Bertram B. Boltwood	223
The $\alpha$ Rays.—Prof. O. W. Richardson	223
The Effect of Radium on the Strength of Threads.—J. L. McKee and Prof. W. B. Morton	224
The Upheaval of the Sea Coast by Earthquakes.—Dr. T. J. J. See; J. M.	224
Emerald Green Sky Colour.—F. G. Collins	224
Perception of Relief by Monocular Vision.—T. Terada	224
The Geology of the German Antarctic Expedition. (Illustrated.) By J. W. G.	224
Cotton Cultivation in the United States of America. Notes. (Illustrated.)	227
Our Astronomical Column:—	
Comet 1906g (Thiele)	231
The Lunar Crater Linné	231
Ephemerides of Comets and Planets	231
A Résumé of Aërography	231
Jupiter's Satellites	231
The Causes of Solar Phenomena	231
Prizes Awarded and Proposed by the Paris Academy of Sciences	231
Recent Work of the American Bureau of Standards. By Dr. J. A. Harker	233
Researches in Stellar Parallax. By W. E. P.	234
Russian Scientific Publications	235
The Brussels Sociological Society	236
Is there Determinate Variation?	237
University and Educational Intelligence	237
Societies and Academies	238
Diary of Societies	240